STAT

A REPORT
on
Dychow Dam

Prepared by
Project Treasure Island
for
Directorate of Intelligence, USAF
1954

STAT

STAT

A REPORT

on

DYCHOW DAM (POLAND)

Prepared by

Project Treasure Island

for

Directorate of Intelligence, USAF

1954

R E P O R T

on

Dychow Dam in Poland

This report contains information on the Dychow Dam-on the Bobr (Bober) River near Krzywaniec (Kriebau) Village-which forms a storage reservoir for the power plant at Dychow (Deichow). The dam is also used for the control of floods.

The dam was built in the early 1930s when this region was part of Germany. Since the end of World War II, this region belongs to Poland.

The report is the result of a study of German and Polish open sources, published during 1934 to 1938, and 1948 to 1952, and listed in the attached bibliography. Among these, the most valuable are listed under Nos. 1 and 2.

The information is compiled according to the P.V.D. questionnaire as follows:

I. Functions

A. The system of which the dam forms a part

The Bobr River System consists of:

1. The upper storage reservoir, known as the "Zeschau Reservoir" (Staubecken Zeschau) or "Reservoir No. 1" (see Figs. 1, 2 and 3).
2. The dam forming the above reservoir (see Fig. 3), is described in the present report under the name of "Dychow Dam". Some sources (see Fig. 2) call it Krzywaniec (or Kriebau) Dam.
3. The intake built at the Dychow Dam for the diversion canal (see Fig. 3).

4. The 20-km long diversion canal (Figs. 1, 2 and 3), supplying water from the Zeschau Reservoir to the Dychow Plant headworks.

5. The Dychow headworks consisting of the diversion canal outlet, the pondage reservoir, forebay, surge tank and penstocks (see Fig. 4).

6. The powerhouse with a tailrace leading to the lower reservoir, known as Krosno (Crossen) Reservoir (see Figs. 1, 2 and 4). This reservoir is used for pumping water to the Dychow Pondage Reservoir as well as a storage reservoir for the Krosno Power Plant (see separate report).

B. The dam within the system

As mentioned in the preceding chapter, the Dychow Dam near Krzywaniec stores the water in the Zeschau Reservoir for the purpose of power production at the Dychow Hydroelectric Power Plant. It also controls the flow in the Bobr River.

C. Highways and/or railways resting on the dam or adjacent thereto

There is no highway or railroad atop the dam, only a steel bridge serving as foot path. The diversion canal is crossed by 9 bridges of which one is a railroad bridge (see Figs. 1 and 2). A highway and a railroad run near the surge tank. For bridges near the surge tank see Figs. 1, 4 and 5. The railway steel bridge has a 60 m span.

D. Navigation locks in connection with dam

There is no navigation lock.

II. Location and designation

A. Data which will make possible pin-pointing the installation

The Dychow Dam near Krzywaniec (Kriebau) is 8.3 km downstream from the source of the Bobr River. It is located in Wojewodztwo Zielonogorskie, Ziemia Lubuska. The location of the dam with the canal intake is shown on map Fig. 3. The layout of the development is given in Fig. 1.

B. Official, local, and popular names of dams and dependent installations

Dam:

Wehranlage Kriebau (German), Krzywaniec Tama (Polish)

Reservoir:

Staubecken Zeschau (German), Dychow Rezerwuar (Polish)

Pondage Reservoir:

Speicherbecken Deichow (German),

Plant:

Krafthaus Deichow (German), Dychow Elektrownia (Polish)

One 1952 Polish source states that the Dychow Plant will carry the name of Ludwik Warynski.

III. Dimensions

A. Dam

1. Maximum and minimum head on dam

See Fig. 6.

The head is 5.9 m.

2. Maximum and minimum depth of water below dam

See Fig. 6.

3. Total height of dam above river bed and above foundations

See Fig. 6.

4. Elevation of bottom of penstocks at dam

There is no penstock.

5. Total thickness at base and at high water level

See Fig. 6.

6. Slopes of dam faces

See Fig. 6.

7. Length at crown, across river bed, and along spillway

See Fig. 6.

B. Reservoir

The Zeschau Reservoir (Figs. 1, 2 and 3), formed by the dam has the following characteristics:

1. Capacity

2,400,000 cu m; when filled to 72.0 m elevation: 1,140,000 cu m.

2. Area

See Fig. 3.

3. Length, width and depth

5.4 km long.

4. Detailed plan in vicinity of dam

See Figs. 3 and 7.

A concrete bridge crosses the reservoir at the village Zeschau.

C. Navigation locks in connection with dams

There is no navigation lock.

IV. Hydrological data (rainfall, flow, etc.)

The catchment area is 5,625 sq km.

The Bobr River has its source in the Riesengebirge (Giant Mountains),

flows north and joins the Odra River at Krosno. In its upper reaches it has the character of an Alpine river.

The Bobr River in its lower 44.5-km section, has a fall of 33 m.

Medium flow	45 cu m/sec.
Minimum flow	13 cu m/sec.
Maximum flow	1,500 cu m/sec.

V. Foundation conditions and soil characteristics under and near the dam

The foundation under the dam is gravel and sand.

VI. Design data

A. Structural type or types

The dam at Krzywaniec is of the wheeled sluice gate type with movable splashboard (see Figs. 6 and 7).

B. Material used

Concrete and steel.

C. Design criteria

No information available.

D. Details and equipment

Gates

The Krzywaniec Dam (Figs. 6 and 7) has 3 wheeled gates. Their total height is 5.90 m, of which 1.50 m is the splashboard, and their width is 24 m. The dam can pass 1,100 cu m/sec of flood waters. A steel bridge is built over the gates.

Rack wall

A rack wall protecting the canal intake adjoins the left pier of the dam. It is erected on a gravel sill 3 m higher than the river bed. The rack wall has 14 rack sections. The clearance between rack bars is 210 mm. The rack wall is 84 m long. A foot path, 1.50 m wide runs on top of it. Four of the 14 sections, each 7 m wide, can be moved to permit passage of boats.

Canal intake

The intake is built to the right of the dam (see Figs. 3, 7 and 8).

The intake has 3 sluice gates, each 6 m wide and 5.80 m high. The right and left wheeled gates are of single leaf type, while the center gate consists of two leaves. The lower leaf is a wheeled gate and the upper one is of the sliding type. The gates can be operated independently, either electrically or by hand. Telephone connection exists between the guard at the intake works and the Dychow Plant.

Diversion canal

A canal leads in the northwest direction from the Zeschan Reservoir intake to the Dychow Plant's headworks. The canal is 20.4 km long, and is built to pass 100 cu m/sec. The canal is 7.35 deep and 32.90 m wide on top (see Fig. 9). It is crossed by 8 bridges serving as

foot paths, by one road bridge (Krosno-Sommerfeld) and by a one-track railroad bridge (see Fig. 1).

Canal outlet

The canal outlet at the Dychow Headworks consists of 3 steel wheeled sluice gates, each 5 m wide, 5.70 m high (see Figs. 4, 10, 11 and 12).

Pondage reservoir

The storage pond of the Dychow Plant (Figs. 1 and 4) has a capacity of 4,000,000 cu m and covers an area of 1 sq km. Its foundation consists of a clay layer 0.20 m thick laid on sand and porous gravel.

The pond is formed by retaining walls shown in Fig. 11. It can be filled with water either coming from the diversion canal outlet or pumped from the lower (Krosno) reservoir.

Canal (from pondage to surge tank)

The canal forming the forebay, is lined with a 25-cm layer of concrete. The flow is 330 cu m/sec.

Surge tank and penstocks

See Chapter VII.-4.

VII. Special data on power dams

A. Capacity (kva), present and proposed

The power plant was designed to have 3 turbines. All prewar and postwar sources speak of the installation of 2 turbines.

Present capacity: 48,000 kw (1952)

Proposed capacity: 72,000 kw (1952)

B. Output (Kwh/yr), achieved and proposed

About 80,000,000 Kwh/yr (1936).

C. Powerhouse

1. Location

The powerhouse is located at Dychow (see Figs. 1,2,4, and 13).

2. Structure

Soil and foundation conditions under the surge dam and powerhouse are shown in Fig. 13. The powerhouse under construction and completed are shown in Figs. 14 and 15.

3. Installations

See Figs. 16 and 17.

The Dychow Plant was originally equipped with:

Turbines

2 Kaplan turbines, for a 29.80 m head, 100 cu m/sec, flow and 187 rpm. One turbine was manufactured by Voith (diameter 3,875 mm) the other turbine by Escher Wyss (4,000 mm diameter) a third turbine was planned for future installation.

Generators

2 generators, each for 27,500 kva, 10,500 V. These generators were ordered in 1934 from SSW and in 1937 the order for an additional generator was placed. 1950 to 1952 Polish sources point out that Soviet machinery was installed, at the plant. One of the machines carries the label "MEP ZSRR ELEKTROSILA im. Kirova, Produktsiya 1951" serial number 12. (The plant is in Leningrad.) The same sources mention 2 turbogenerators as completed and in operation.

Transformers

See Figs. 15, 16 and 17.

The 10.5 kv/110-115 kv transformers are installed outside the power plant on the downstream side.

4. Number, dimensions, location and type of penstocks

Surge tank

See Figs. 4, 13 and 16.

The surge tank is equipped with a rack 47 m wide, 10.5 m deep and spaced at 50 mm. The rack is cleaned by a special automatic device. The tank has 3 wheeled gates, each 8 m wide and 7.50 m high. There are gates with 9 stoplogs.

Penstocks

See Figs. 4, 13, 14, 16 and 17.

There are 3 penstocks, each 56 m long and 6.40 m in diameter. The pipes are 12 to 19 mm thick, have a 40 cm concrete surface and are covered with 0.50 m of soil. The 2 side penstocks have sections leading to the pumps.

Tailrace

The tailrace of the Dychow Plant forms the headrace of the Krosno Plant (see Figs. 1, 2 and 16). It is 400 m long, designed for a 330 cu m/sec. flow. The bottom is 55 to 110 m wide. It is spanned by a narrow bridge, 81 m long.

D. Places of installations served; ties with power grids

No information available.

E. Location and description of transformer yards and transmission system

The connection diagram of the Dychow step-up substation is shown in Fig. 18. It is controlled from a separate control house. A double transmission line 110 kv, 48 km long connects Dychow with the substation Finkenheerd.

VIII. Historical data

A. Name and background of designer

Siemens-Schuckertswerke.

B. Dates of construction

Construction started on Nov. 3, 1933 and was completed in 2 1/2 years.

C. Sources of materials

No information available.

D. Records of war damage, failures, removal of equipment, etc.

According to a 1948 Polish source, the Dychow Hydroelectric Power Plant and the storage pond (Reservoir No. 2) were damaged during the war and the plant stopped production in 1945. Later the dam was restored by Poland with USSR assistance.

E. Data on conditions of structure at any date

Scattered 1952 sources report on the installation of turbo-generators in the Dychow Plant.

F. Proposals for enlargement, alteration, extension of function

Postwar sources report that the Dychow Power Plant had to be re-equipped. The new equipment is predominantly of Russian design

and make and installed with the cooperation of Soviet engineers.

IX. Graphical material

A. Photos, especially those taken during construction

Photographs attached to this report are shown in Figs. 5, 7, 8, 11, 12, 14 and 15.

B. Working drawings, general and detailed

Not available.

C. Record and publication drawings

Drawings attached to this report are shown in Figs. 1, 2, 3, 4, 6, 9, 10, 13, 16, 17, and 18.

D. Sketches by persons who have seen installations

Not available.

BIBLIOGRAPHY

1. Pussel, H., Pester, K., DAS BOBERKRAFTWERK. Siemens Zeitschrift (Berlin), Vol. 18, No. 12, 1938, pp. 515-528

2. Konietzny, H. DAS BOBERKRAFTWERK DER MARKISCHEN ELEKTRIZITATSWERK A.G. Zentralblatt der Bauverwaltung (Berlin), Vol. 57, No. 47, 1937, pp. 1169-1182

3. Warrelmann, G., DAS BOBERKRAFTWERK DER MARKISCHEN ELEKTRIZITATSWERK A.G. Elektrotechnische Zeitschrift (Berlin), Vol. 57, No. 25, 1936, pp. 699-705

4. Leutelt, H., Haigis, E., DIE MASCHINENAUSRUSTUNG DES WASSERKRAFTWERKES DEICHOW. Zeitschrift des Vereines Deutscher Ingenieure (Berlin), Vol. 80, No. 34, 1936, pp. 1032-1035

5. Fieguth, H.O., STROMERZEUGER FUR DAS WASSERKRAFTWERK DEICHOW. Verein Deutscher Ingenieure (Berlin), Vol. 81, No. 3, 1937, p. 87

6. Lippert, F. VOM BOBERKRAFTWERK DEICHOW. Deutsche Wasserwirtschaft (Stuttgart), Vol. 31, No. 10, 1936, p. 225

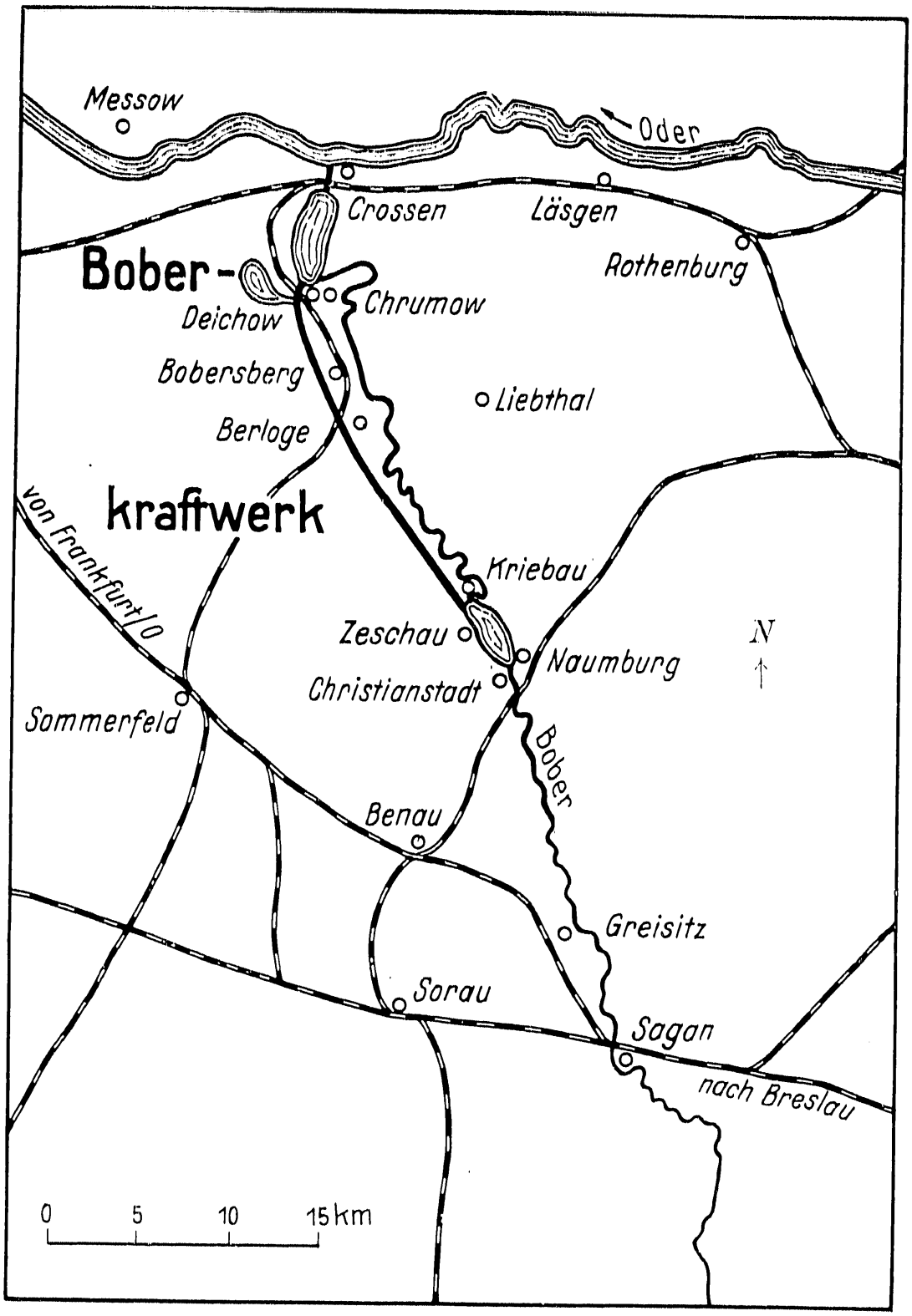
7. Deutsche Wasserwirtschaft (Stuttgart), Vol. 32, No. 6, 1937, p. XIV.

8. DAS NEUE BOBERKRAFTWERK. Elektrotechnische Zeitschrift (Berlin), Vol. 55, No. 8, 1934, p. 185

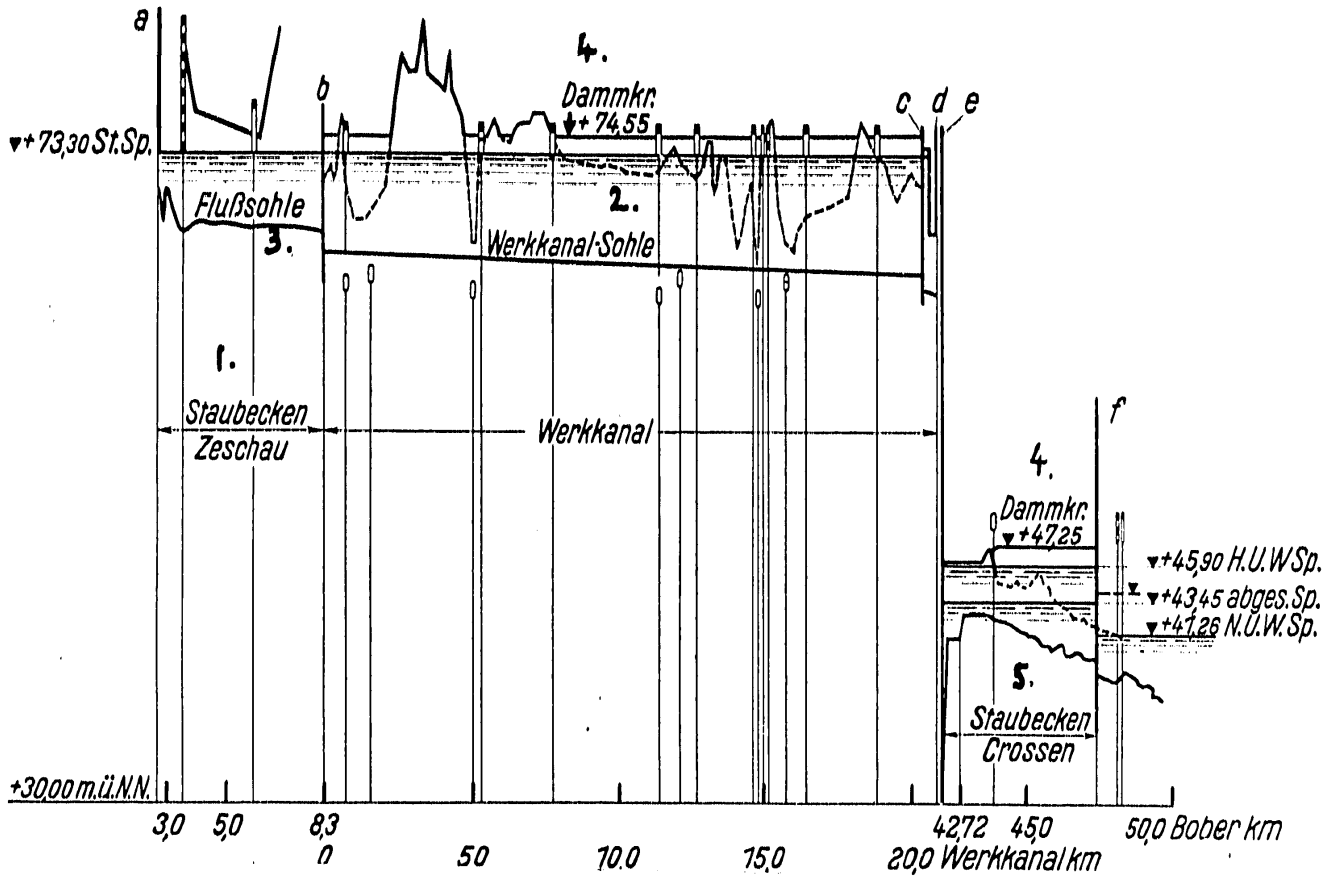
9. Leutelt, H., Haigis, E., DAS SPITZENKRAFTWERK DEICHOW DER MARKISCHEN ELEKTRIZITATSWERK A.G., Wasserkraft und Wasserwirtschaft, (Munchen) Vol. 33, No. 11/12, 1938, p. 129-134

10. Przeglad Techniczny (Warsaw), Vol. 73, No. 10, 1952, p. 358

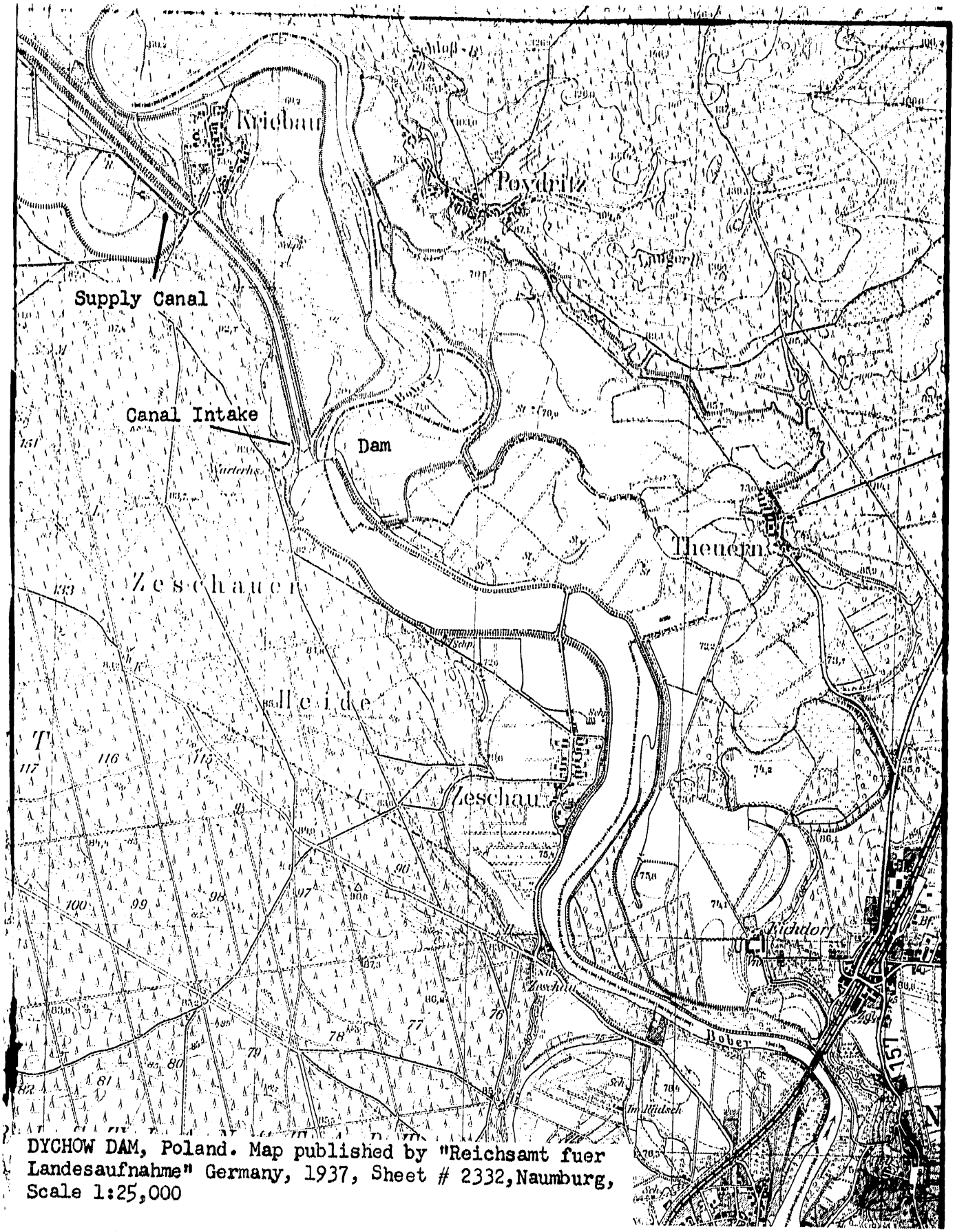
11. Trybuna Ludu (Warsaw), No. 133, 1952, p. 3



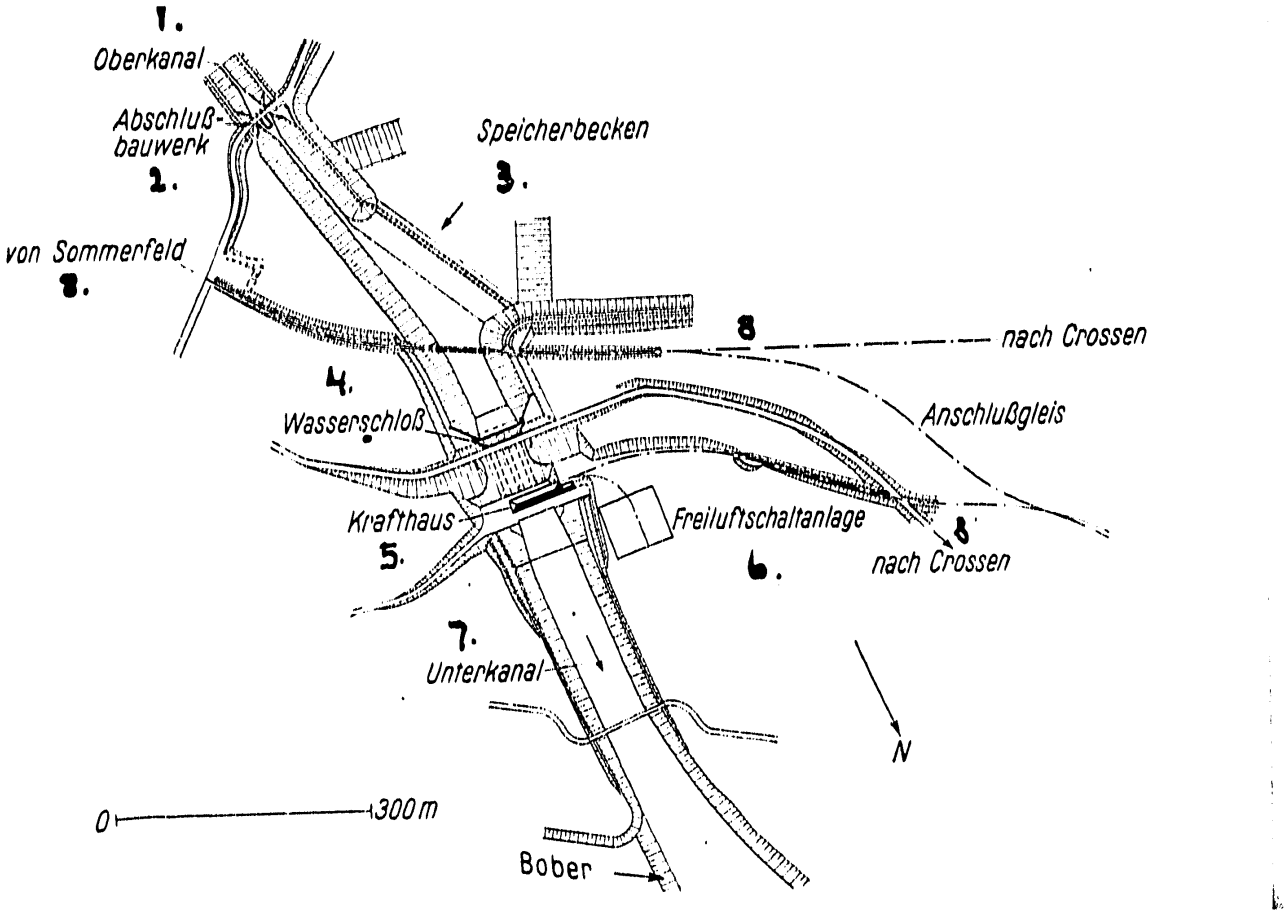
DYCHOW and KROSNO DAMS, Poland. Plan.
Source: Zentralblatt der Bauverwaltung, Berlin, 1937, p. 1170



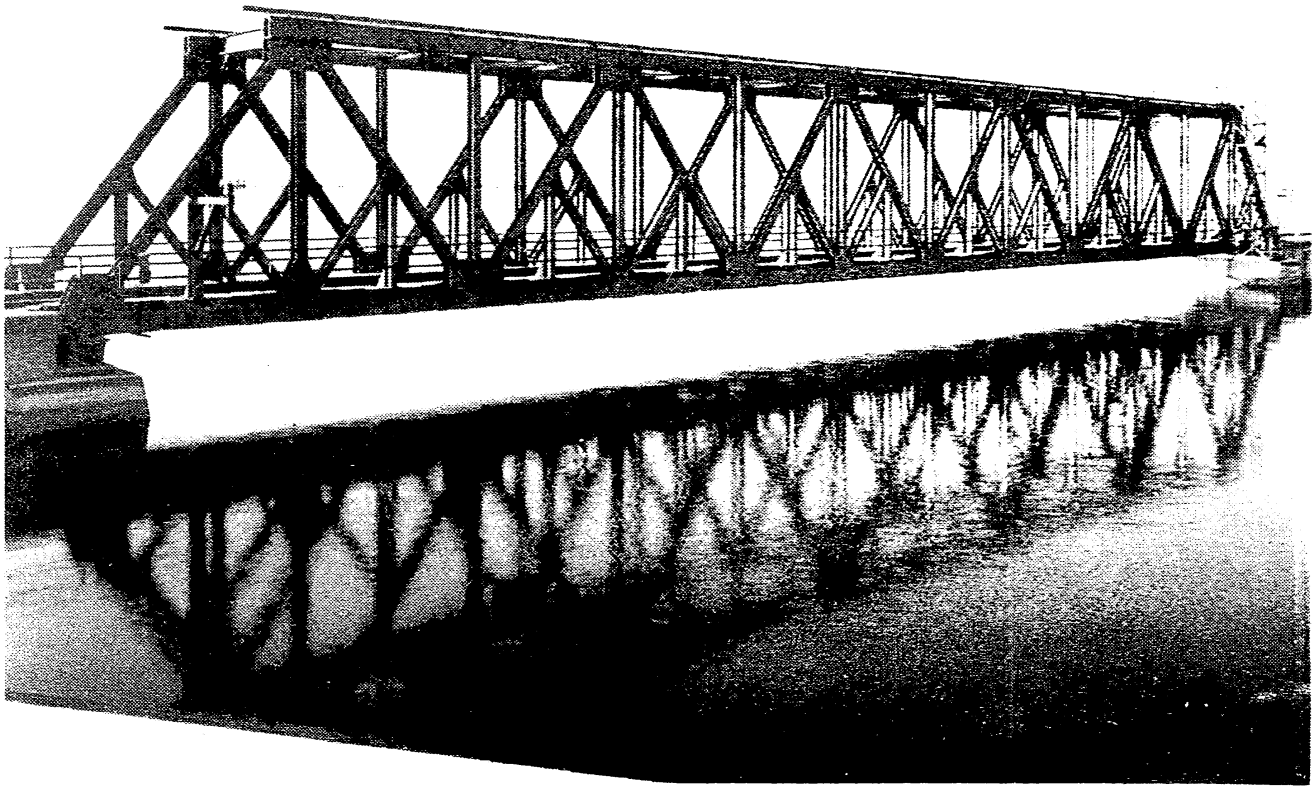
DYCHOW and KROSNO DAM, Poland. Profile of Reservoirs and Supply Canal. a)Krzystkovice b)Krzywaniec Dam c)Canal Outlet d)Pondage Reservoir e)Dychow Powerhouse f)Krosno Dam and Powerhouse 1)Zeschau Reservoir 2)Canal bed 3)River Bed 4)Crest of Dam 5)Krosno Reservoir. Source: Elektrotechnische Zeitschrift, Berlin, 1936, p. 699



DYCHOW DAM, Poland. Map published by "Reichsamt fuer Landesaufnahme" Germany, 1937, Sheet # 2332, Naumburg, Scale 1:25,000



DYCHOW DAM, Poland. Layout of Power Plant. 1)Canal 2)Canal Outlet 3)Pondage Reservoir 4)Surge Tank 5)Powerhouse 6)Transformer Yard 7)Tailrace 8)Roads. Source: Elektrotechnische Zeitschrift, Berlin, 1936,p.700



DYCHOW DAM, Poland. Railroad Bridge Across Headrace. Source: Zentralblatt der Bauverwaltung, Berlin, 1937, p. 1175

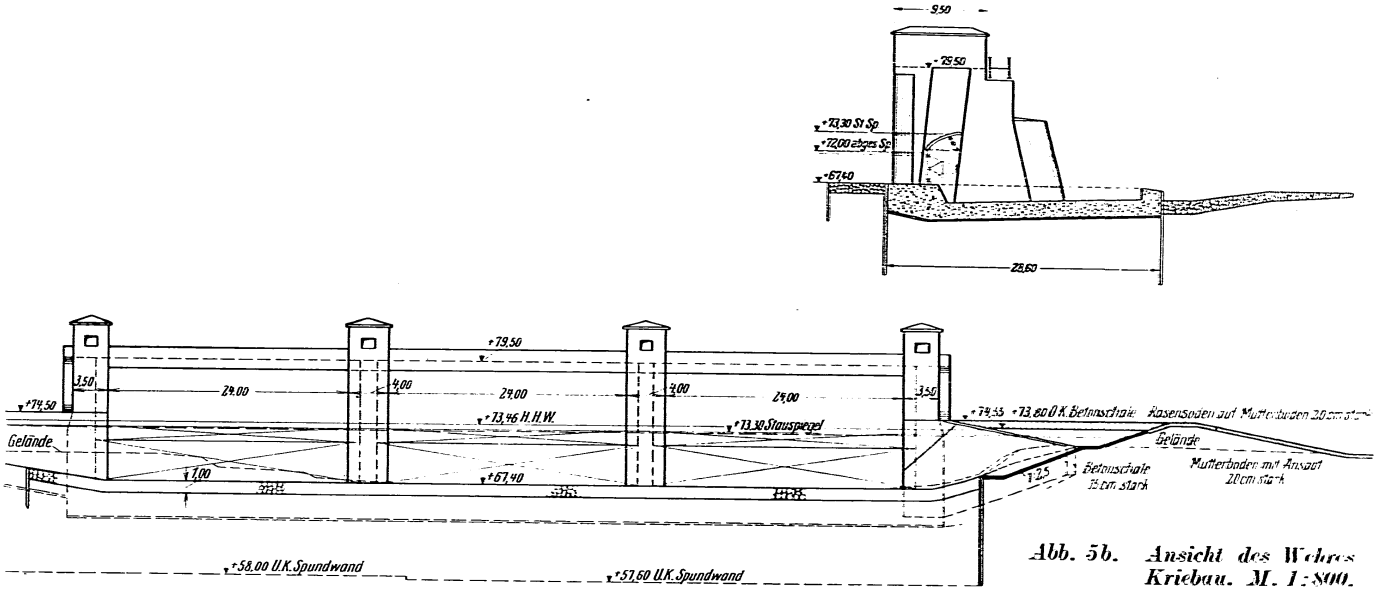
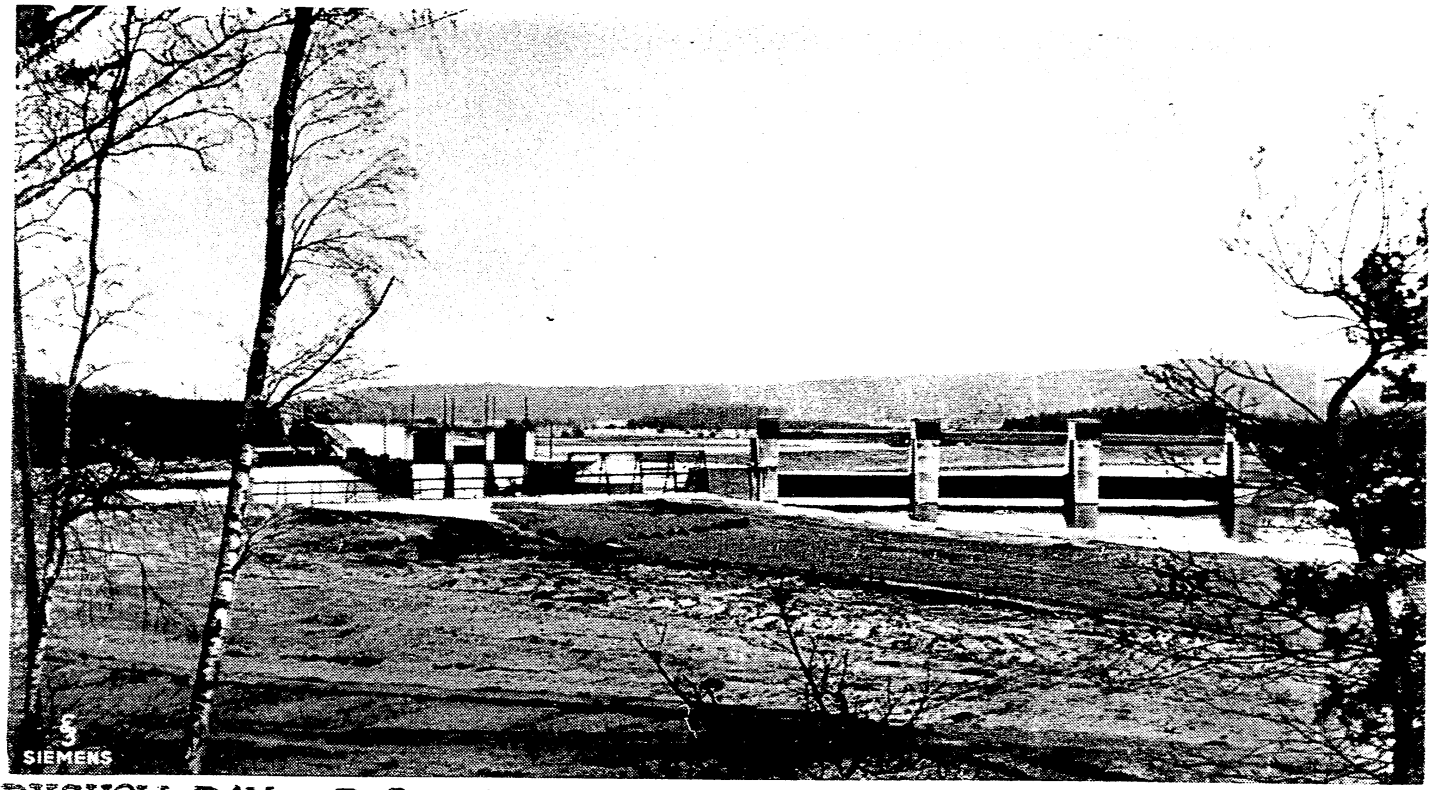
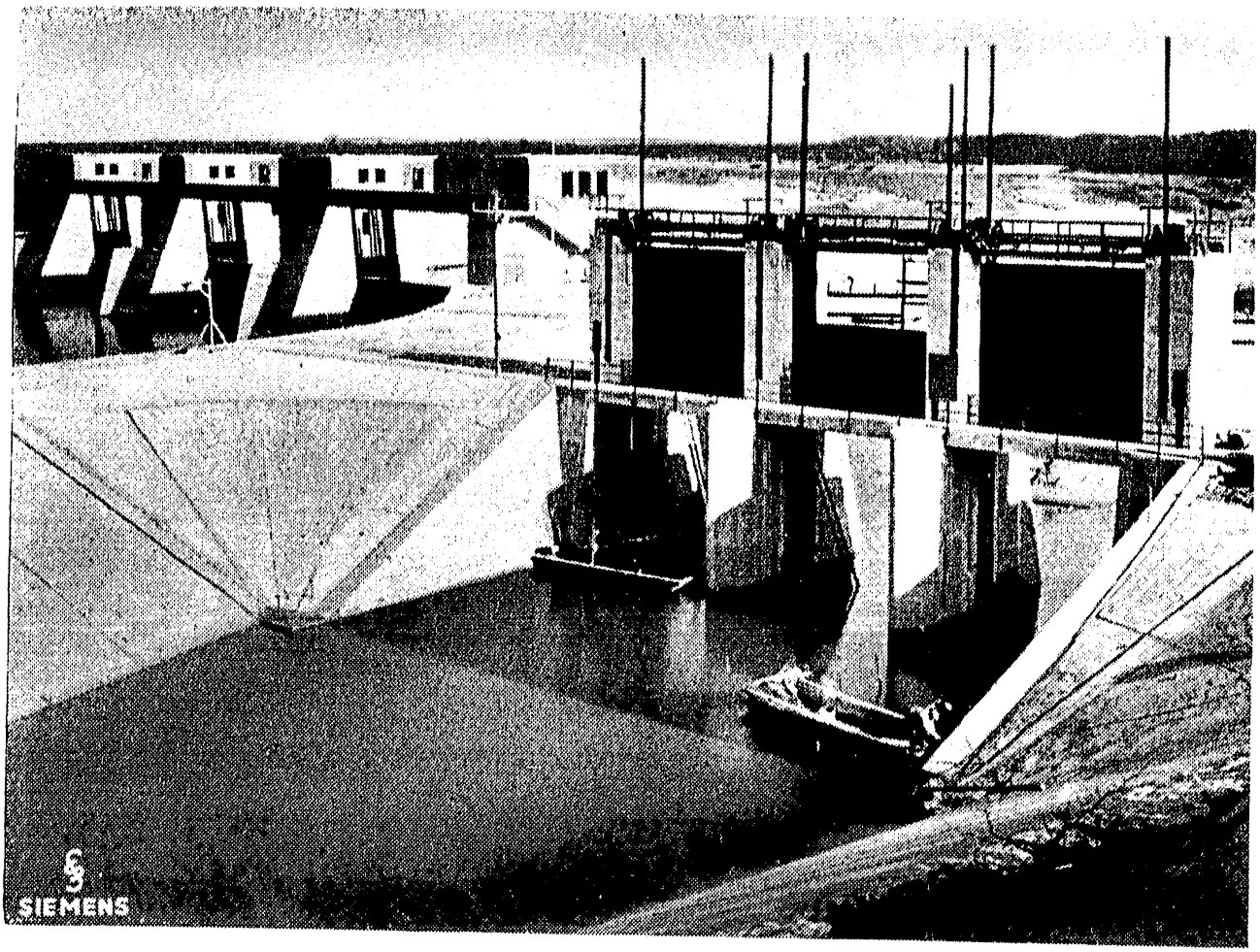


Abb. 5b. Ansicht des Wehres Kriebau. M. 1:800.

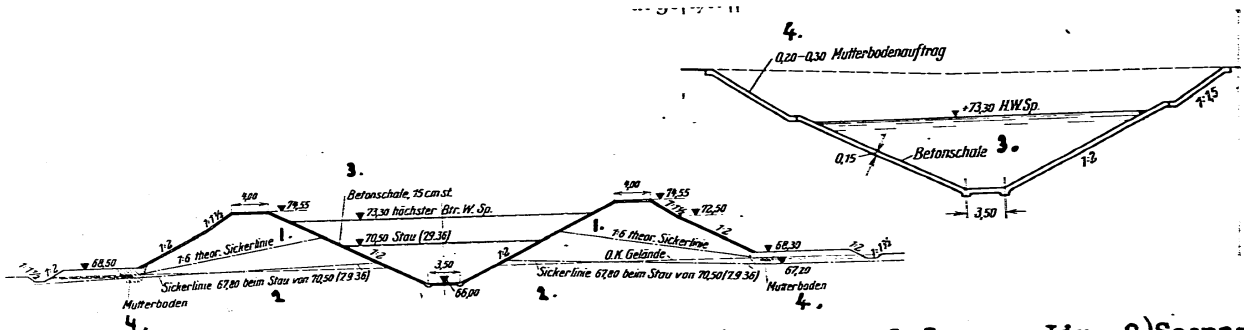
DYCHOW DAM, Poland. Cross-Sections of Krzywaniec Dam. Source: Zentralblatt der Bauverwaltung, Berlin, 1937, p. 1171



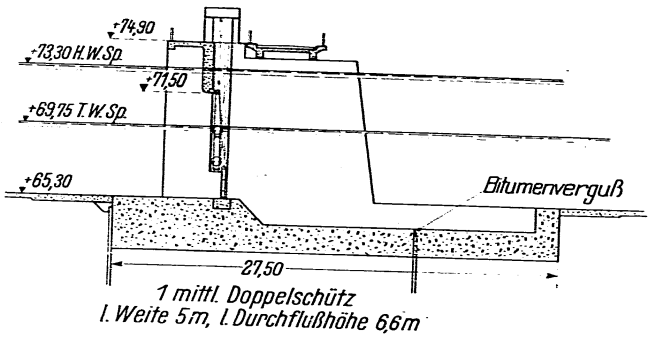
DYCHOW DAM, Poland. Dam with Empty Reservoir in Foreground. Source:Siemens Zeitschrift,Berlin,1938,p.518

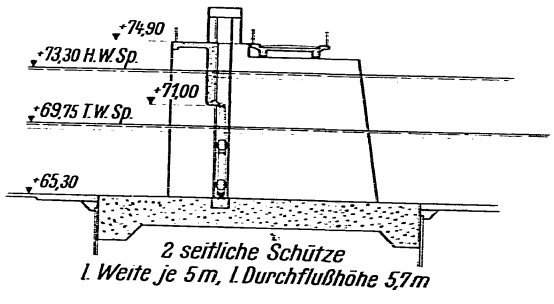


DYCHOW DAM, Poland. Dam and Canal Intake. Source: Siemens Zeitschrift, Berlin, 1938, p. 518

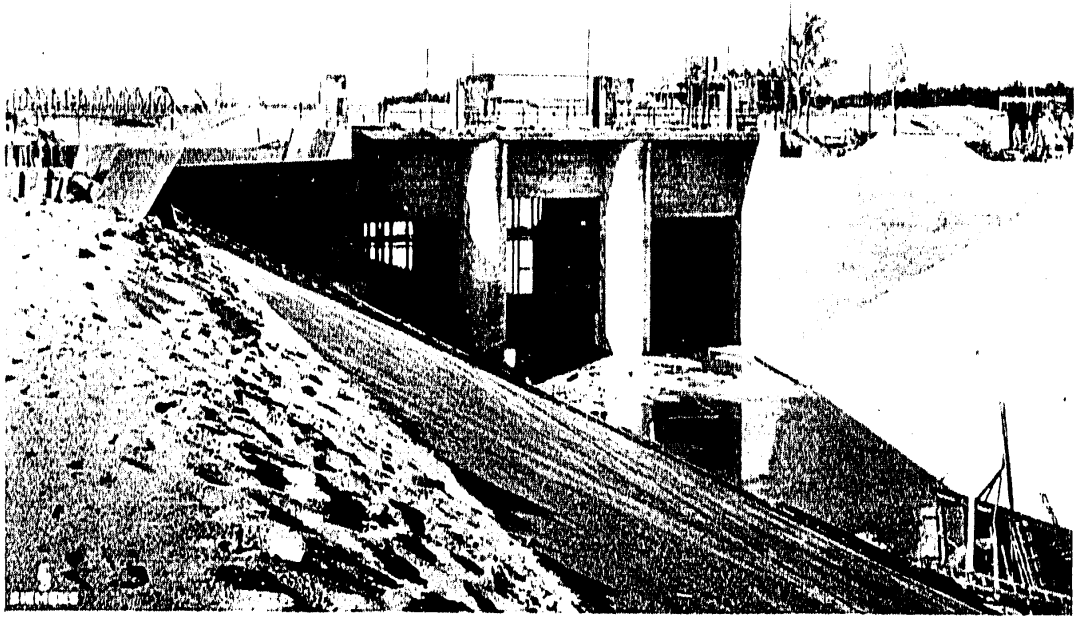


DYCHOW DAM, Poland. Cross-Section of Canal. 1)Theoretical Seepage Line 2)Seepage Line when Canal Filled to 70.50 m elev. 3)Concrete Lining 4)Original Ground Surface. Source: Zentralblatt der Bauverwaltung, Berlin, 1937, p. 1171

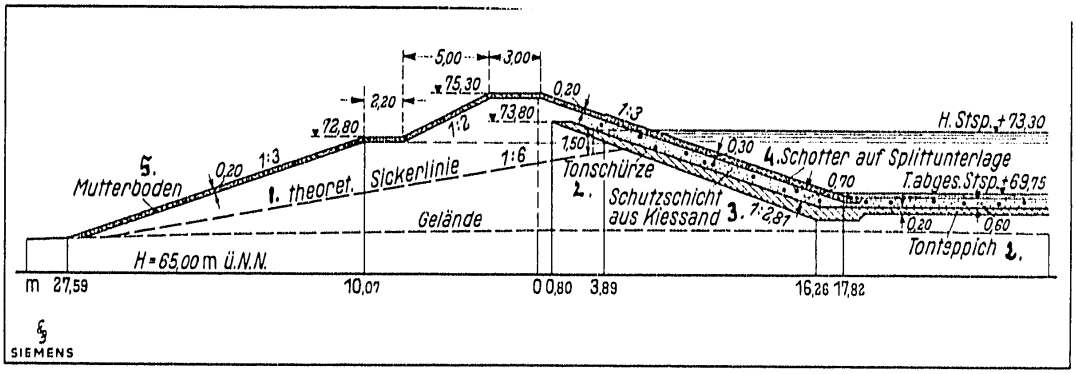




DYCHOW DAM, Poland. Canal Outlet. Left: Cross-Section of Middle Gate, Right: Cross-Section of Side Gates. Source:Zentralblatt der Bauverwaltung,Berlin, 1937, p. 1174

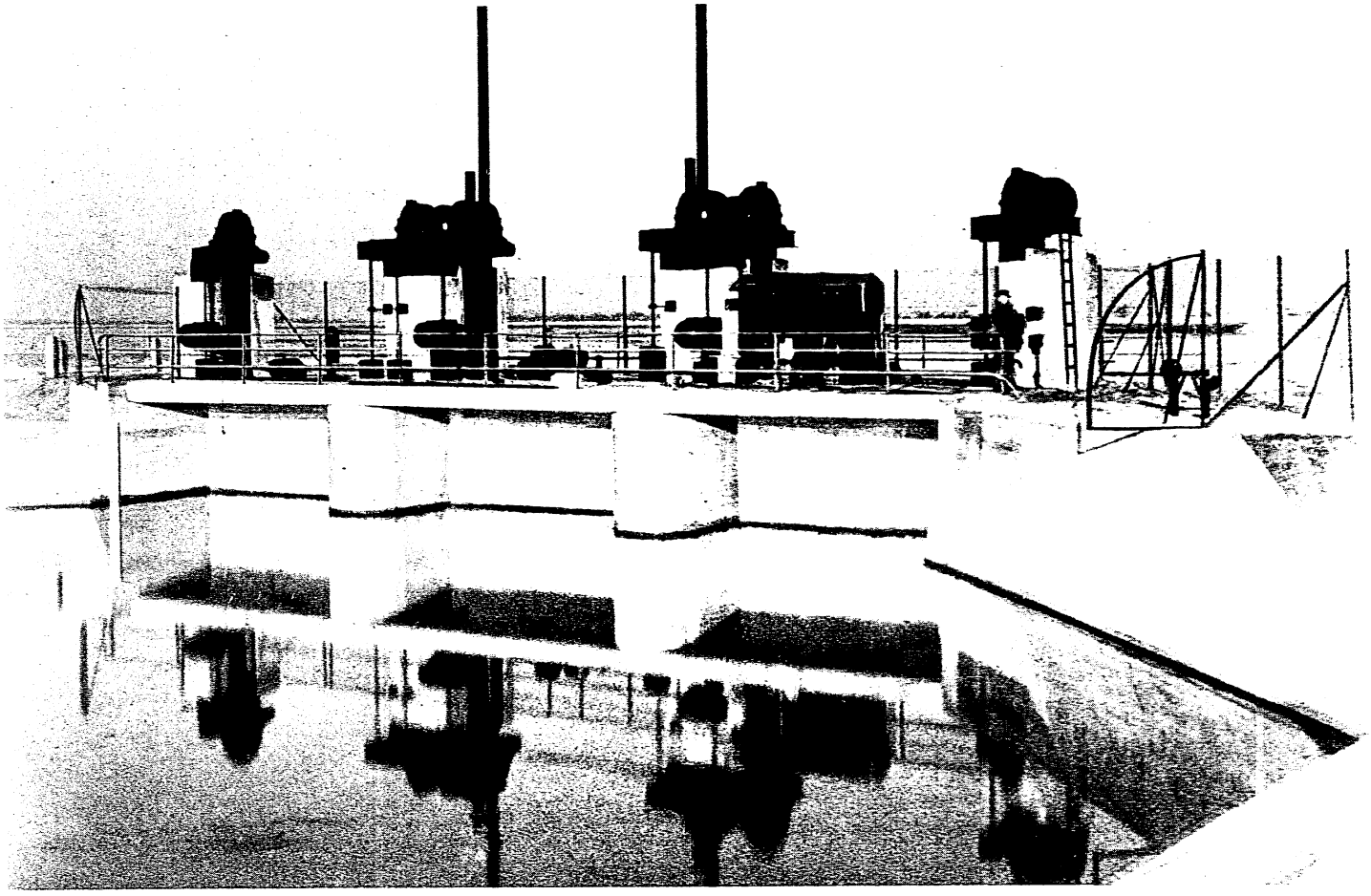


Canal Outlet.



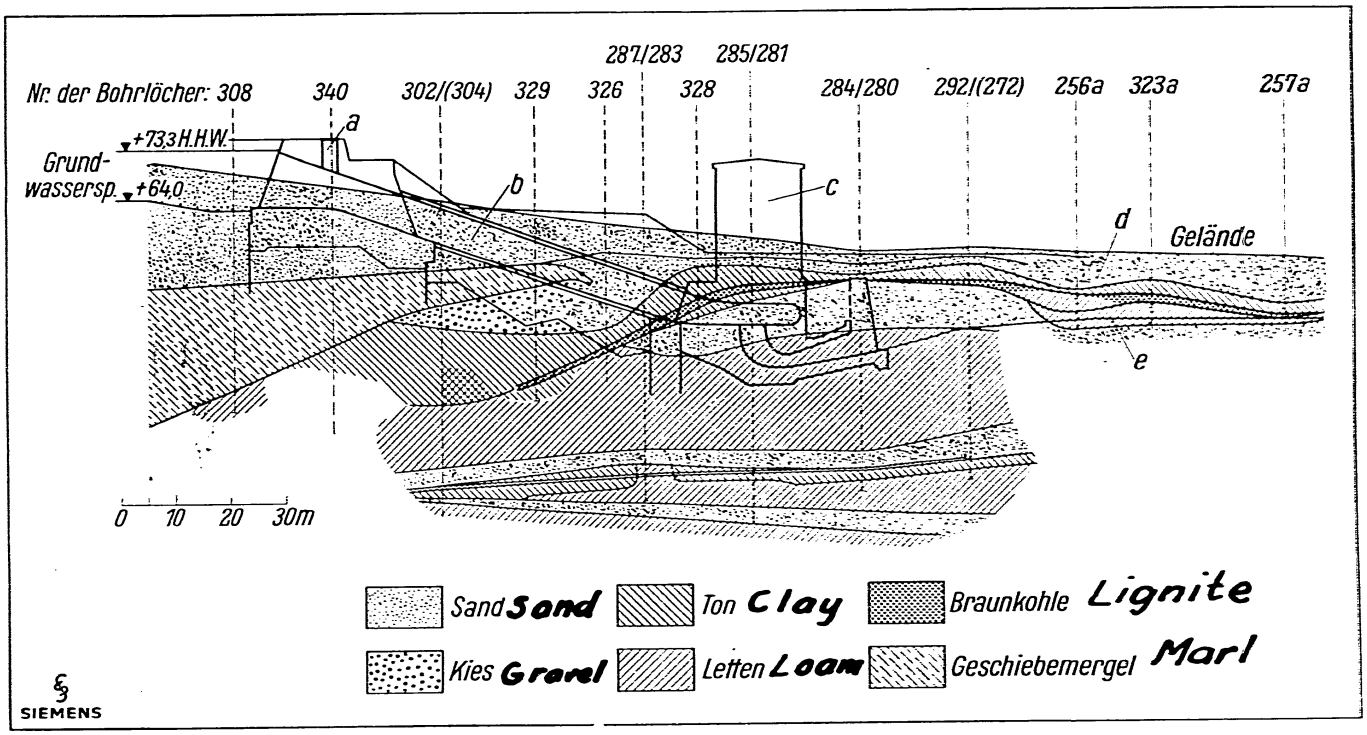
Cross-Section of Retaining Wall of Pondage Reservoir. 1) Seepage Line 2)Clay 3)Protective Layer of Coarse Sand 4)Gravel 5) Original Ground Surface.

DYCHOW DAM, Poland. Source: Siemens Zeitschrift, Berlin, 1938, p. 520



DYCHOW DAM, Poland. Outlet of Supply Canal. Source: Zentralblatt der Bauverwaltung, 1937, p. 1175

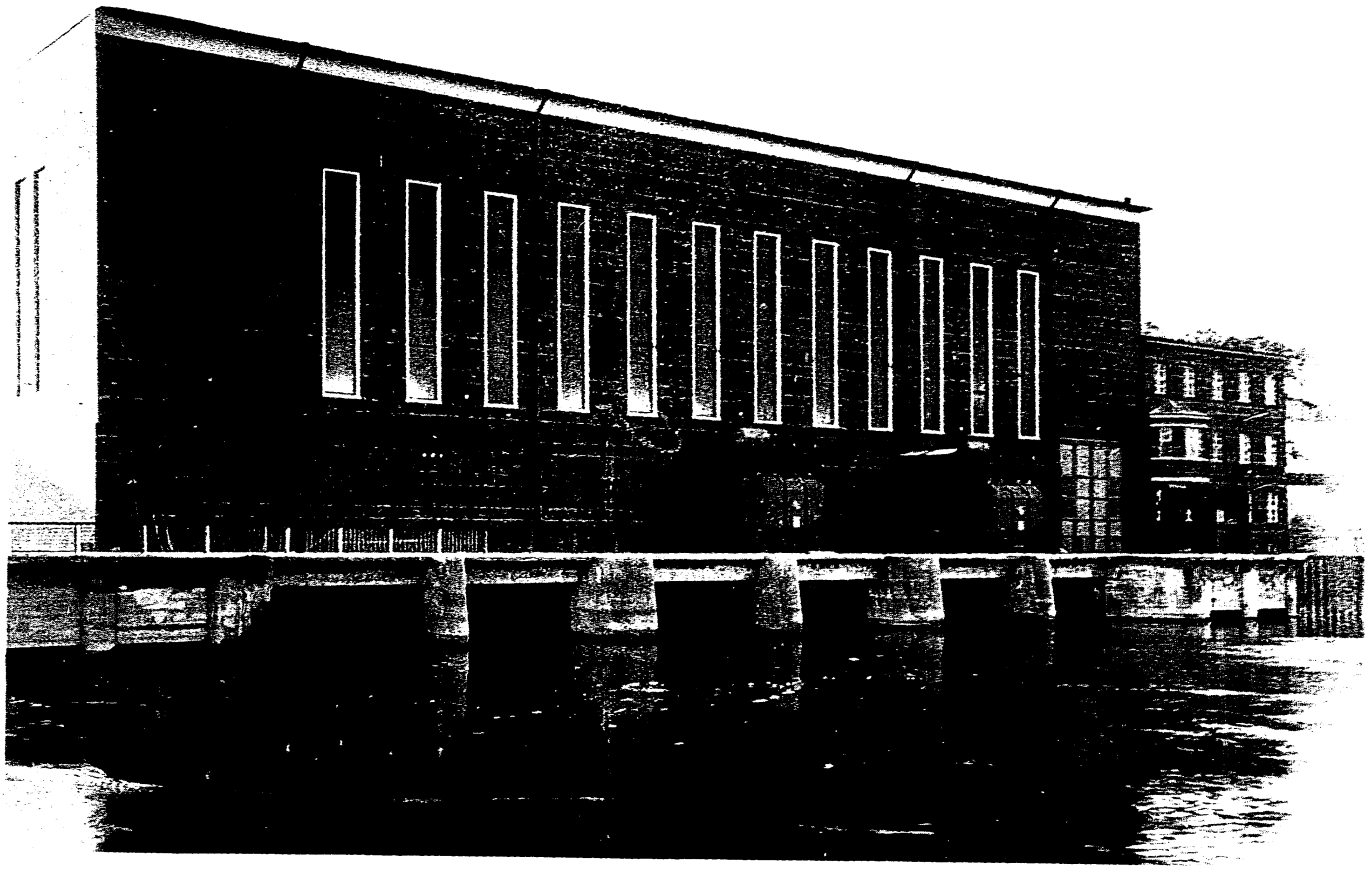
Declassified in Part - Sanitized Copy Approved for Release 2012/08/14 : CIA-RDP82-00040R000200060014-7



DYCHOW DAM, Poland. Geological Profile Below Penstock and Powerhouse. a)Surge Tank b)penstock c)Powerhouse d)Tail-race. Source: Siemens Zeitschrift, Berlin, 1938, p. 521

DYCHOW DAM, Poland. Powerhouse and Penstock Under Construction. Source: Deutsche Wasserwirtschaft, Stuttgart, 1937, No. 7, p. XIV

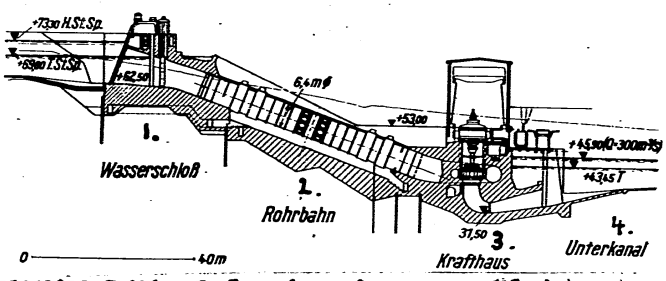
Declassified in Part - Sanitized Copy Approved for Release 2012/08/14 : CIA-RDP82-00040R000200060014-7

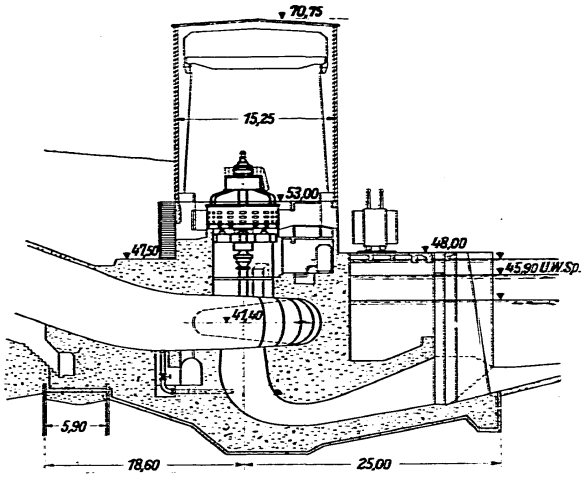


DYCHOW DAM, Poland. Powerhouse. Source: Zentralblatt der Bauverwaltung, Berlin, 1937, p. 1176

Cross-Section of Penstock.

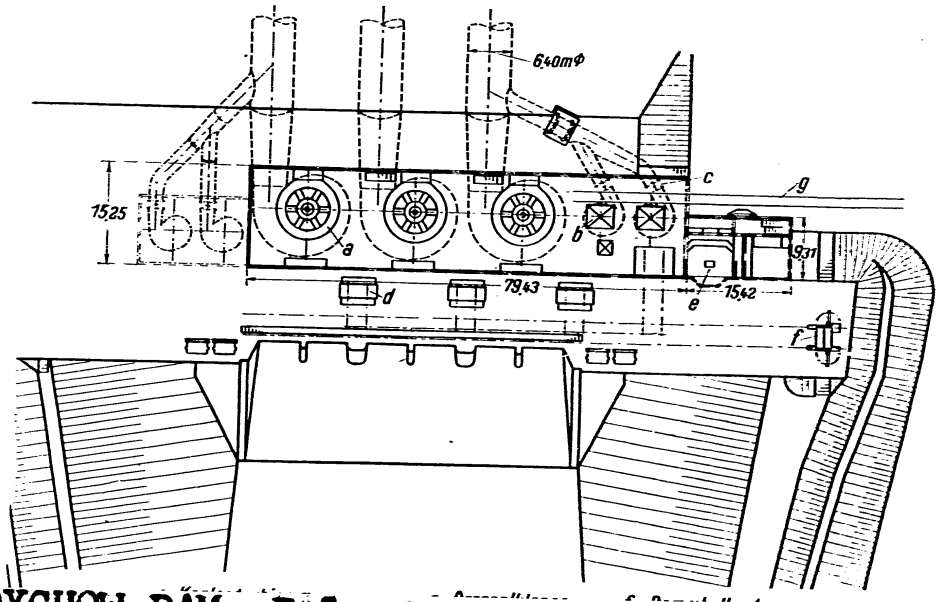
1) Surge Tank
2) Penstock
3) Powerhouse
4) Tailrace



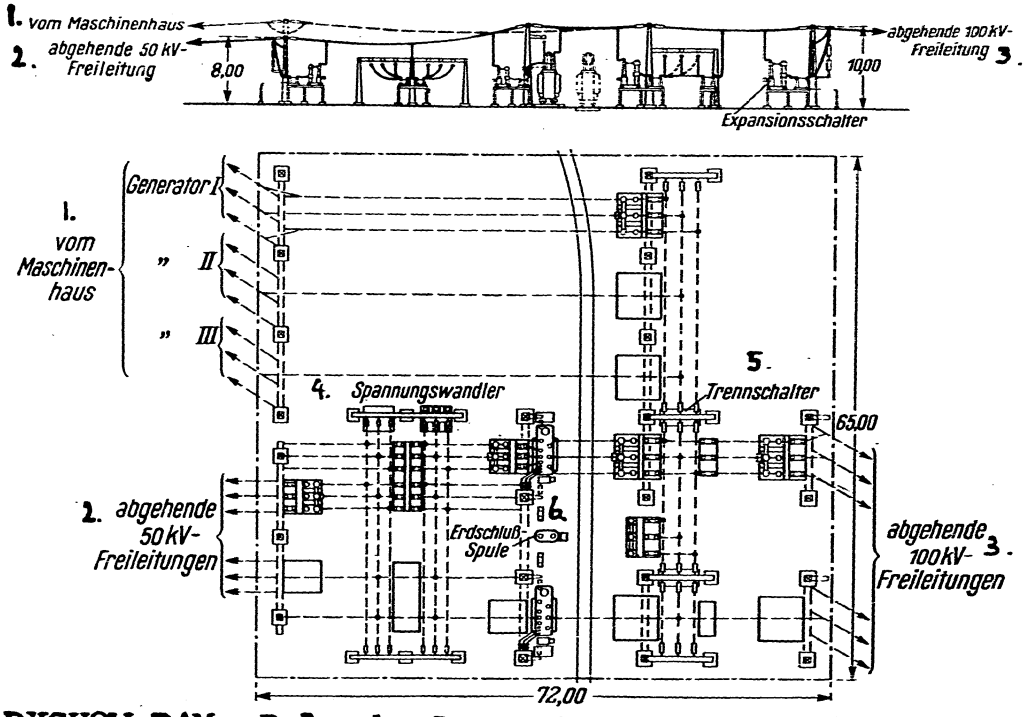


Cross-Section of Powerhouse.

DYCHOW DAM, Poland. Source: Elektrotechnische Zeitschrift, Berlin, 1936, p.701



DYCHOW DAM, Poland. Layout of Power Plant. a)Turbines and Generators b)Pumps with Motor c)Butterfly Valve d)Transformer e)Control Room f)Stoplog Crane g)rails. Source:Elektrotechnische Zeitschrift, Berlin, 1936, p. 701



DYCHOW DAM, Poland. Connection Diagram. 1)from Powerhouse 2)Outgoing 50kv Line 3)Outgoing 100kv Line 4)Transformer 5)Disconnecting Switch 6)Reactance. Source: Elektrotechnische Zeitschrift, Berlin, 1936, p. 704